SUMMARY OF THE
2015 MASSACHUSETTS PIPING PLOVER CENSUS

Photo by: USFWS

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ABSTRACT

This report summarizes data on abundance, distribution, and reproductive success of Piping Plovers (*Charadrius melodus*) in Massachusetts during the 2015 breeding season. Observers reported breeding pairs of Piping Plovers present at 155 sites; 144 additional sites were surveyed at least once, but no breeding pairs were detected at them. The population increased 3.5% relative to 2014. The ***Index Count*** (statewide census conducted 1-9 June) was **663 pairs**, and the ***Adjusted Total Count*** (estimated total number of breeding pairs statewide for the entire 2015 breeding season) was **687 pairs**. A total of 866 chicks were reported fledged in 2015, for an overall productivity of **1.29 fledglings per pair**, based on data from 98% of pairs.

INTRODUCTION

Piping Plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from North Carolina to Newfoundland. The U.S. Atlantic Coast population of Piping Plovers has been federally listed as *Threatened*, pursuant to the U.S. Endangered Species Act, since 1986. The species is also listed as *Threatened* by the Massachusetts Division of Fisheries and Wildlife pursuant to Massachusetts' Endangered Species Act.

Population monitoring is an integral part of recovery efforts for Atlantic Coast Piping Plovers (U.S. Fish and Wildlife Service 1996, Hecht and Melvin 2009a, b). It allows wildlife managers to identify limiting factors, assess effects of management actions and regulatory protection, and track progress toward recovery. In this report, we summarize data on abundance, distribution, and reproductive success of Piping Plovers breeding in Massachusetts in 2015, as observed and reported by a coast-wide network of cooperators.

METHODS

Monitoring and management of Piping Plovers and other coastal waterbirds in Massachusetts is carried out by wildlife biologists, seasonal shorebird monitors, beach managers, researchers, and volunteers affiliated with over 30 federal and state agencies, local municipalities, local and regional land trusts, private conservation organizations, and universities. Cooperators monitored 299 sites in Massachusetts in 2015 for the presence of breeding Piping Plovers.

Abundance

We measure abundance of Piping Plovers in terms of breeding pairs, defined as pairs observed with either a nest or unfledged chicks or that exhibited site tenacity and evidence of pair bonding and territoriality for at least two weeks. We report three different measures of abundance: the *Index Count*, *Unadjusted Total Count*, and *Adjusted Total Count*. The *Index Count*, as reported since 1990, is the total number of pairs tallied statewide each year during a 9-day count period in late May and early June, standardized each year for the entire Atlantic Coast. In 2015, the *Index Count* period was 1-9 June. The objective of the *Index Count* is to estimate population size with minimal double-counting of pairs that may move between or within sites, thereby providing an index to population trends that is likely to be more precise than counts based on observations made over the entire breeding season. The *Index Count* likely minimizes double-counting because it occurs over such a short time period. However, it probably underestimates the actual number of breeding pairs because it does not include pairs that leave the state before, arrive after, or are present but simply go undetected during the 9-day *Index Count* period.

For sites for which "0" is reported for the *Index Count* but "nd" is reported for the *Total Count*, this indicates that the site was surveyed during the *Index Count* period (1-9 June) and no breeding pairs were detected, but during the rest of the breeding season, it was either not surveyed or was surveyed too infrequently during May and June to confidently conclude that no pairs were present for at least 2 weeks.

Since 2000, we have reported two different "Total Counts". The *Unadjusted Total Count* is simply a tally of the total number of pairs reported for all sites over the course of the entire nesting season, with limited effort made to adjust for any pairs that may have been double-counted if they nested unsuccessfully at one location and then renested at another. We then derive an *Adjusted Total Count* by calculating the average of the *Index Count* and the *Unadjusted Total Count*, rounded to the nearest whole number of pairs.

The *Unadjusted Total Count* likely overestimates the actual population by double-counting pairs that establish nesting territories at more than one location in a given year. Without color-banded birds, however, it is impossible to accurately determine whether late-nesting pairs may have nested earlier at a different site, or simply did not arrive or begin breeding activities until June. It is too subjective, and likely inaccurate, to try to adjust the *Total Count* of pairs each year by not tallying late-nesting pairs (*i.e*., pairs reported as "new" pairs that nested after the first week in June), based on the assumption that these birds were probably already counted earlier in the season. We believe that the *Adjusted Total Count* is the most accurate estimate of the actual number of breeding pairs in Massachusetts because it falls midway between the *Index Count* and *Unadjusted Total Count*, which we suspect slightly underestimate and overestimate, respectively, the actual breeding population.

Reproductive success

The primary measure of reproductive success that we report is *Productivity*, measured as number of chicks fledged per pair. The denominator of this ratio is the number of breeding pairs for which fledging data were reported; this includes not only pairs that successfully fledged chicks, but also pairs that cooperators believed did not nest, pairs that nested unsuccessfully (eggs did not survive to hatch), and pairs whose chicks failed to fledge. Since 2000, we have reported two different estimates of *Number of pairs with fledge data*. As with counts of breeding pairs, estimates of the number of pairs for which fledging data are reported will be biased if double-counting of pairs occurs. Double-counting will overestimate the number of pairs in the denominator of the productivity ratio, and thereby will underestimate actual productivity. To reduce the potential bias associated with double-counting, we multiply the *Unadjusted number of pairs with fledge data* (a tally of the total number of pairs with fledge data reported for all sites, with limited effort made to adjust for pairs that may have been double-counted) by the ratio of the *Adjusted Total Count* to the *Unadjusted Total Count* to arrive at the *Adjusted number of pairs with fledge data*.

Data reporting and quality control

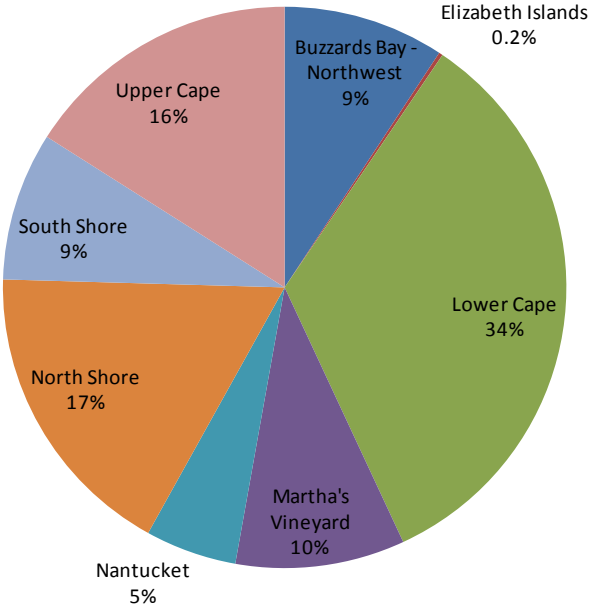
All data were reported by cooperators who filled out a standard Massachusetts Piping Plover Census Form for each site monitored. These forms are used to report data on number of breeding pairs (*Index Count* and *Total Count*); frequency of site visits; design(s) and installation dates of predator exclosures; dates of nest discovery, completion, and hatching or failure; number of eggs on the date the nest was discovered; total numbers of eggs laid, eggs hatched, and chicks fledged; reasons for egg and chick loss, if determined; and comments regarding census results, limiting factors, and management needs. Maps of sites showing the locations of all nests were submitted with census forms. After reviewing census forms, if necessary, we contacted cooperators to obtain missing or incomplete data, resolve inconsistencies, and clarify ambiguities. When we could not obtain the needed information, we used best professional judgment to assign final values or noted data as preliminary; any such instances are noted in Table 1.

RESULTS

Observers reported breeding Piping Plovers at 155 sites in Massachusetts in 2015. An additional 144 sites were surveyed one or more times during May and June, but no breeding pairs were detected at them (**Table 1**). The ***Adjusted Total Count*** in 2015 was **687 pairs**, a 3.5% increase over 2014 (663 pairs). The ***Index Count*** in 2015 was **663 pairs** (vs. 645 pairs in 2014), or 96.6% of the *Adjusted Total Count* (**Table 1**).

Distribution of breeding pairs by region (**Figure 1)** was very similar to 2014, with a modest decline on Cape Cod (54% in 2014) and corresponding increase on the North Shore (13% in 2014). Fifteen sites with ten or more breeding pairs accounted for 48% of the Massachusetts breeding population, while 102 sites with three or fewer pairs accounted for 24%.

Figure 1. Distribution of Piping Plover breeding pairs by Massachusetts region in 2015, based on *Adjusted Total Counts* for each region.



In total, 866 chicks were reported fledged in 2015, resulting in overall productivity of **1.29 fledglings/pair**, based on data from 672 of 687 pairs (98%; the *adjusted number of pairs with fledge data*) (**Table 1**).[1] This represents a 9% increase in productivity relative to 2013 (1.18 fledglings/pair). Productivity varied by region, ranging from 1.63 and 1.57 in Buzzards Bay and the South Shore, respectively, down to 1.18 and 1.05 in the Lower Cape and Martha's Vineyard, respectively. The North Shore (1.36), Upper Cape (1.26), and Nantucket (1.23) exhibited intermediate productivity.

In 2015 the Piping Plover Online Data Entry System (PIPLODES) was introduced, dramatically improving our ability to collect, compile and analyze data. We thank the many coastal waterbird cooperators who helped to develop and test the system, and enter data. With PIPLODES we were able to quickly compile information about 2015 causes of nest loss (**Figure 2**). **Figure 3** shows suspected predator type for nests likely and suspected to have been lost to predation.

[1] The *unadjusted number of pairs with fledge data* was 695 (out of 710; 98%).

Figure 2. Causes of Piping Plover nest loss in Massachusetts, 2015 (n=491 nest attempts).

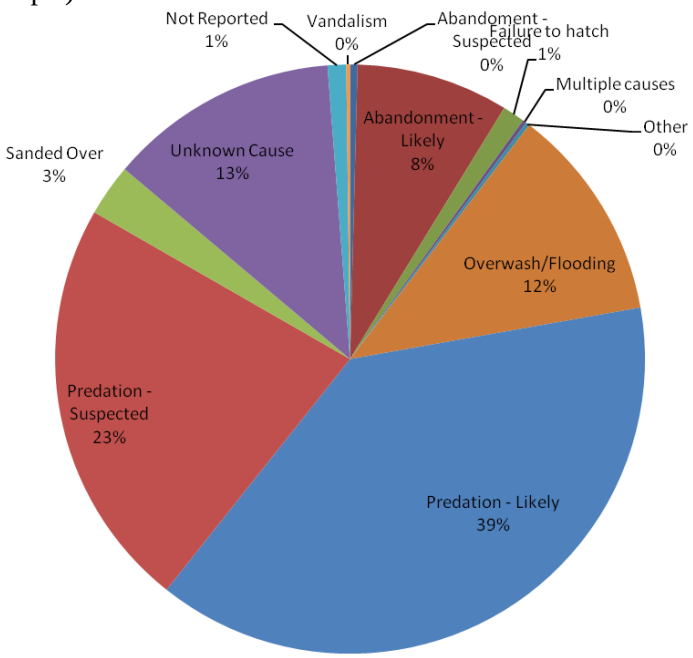
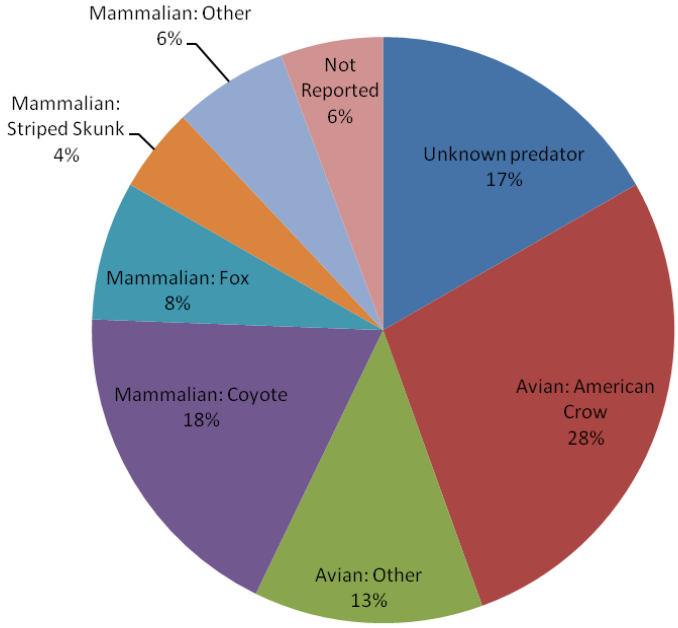


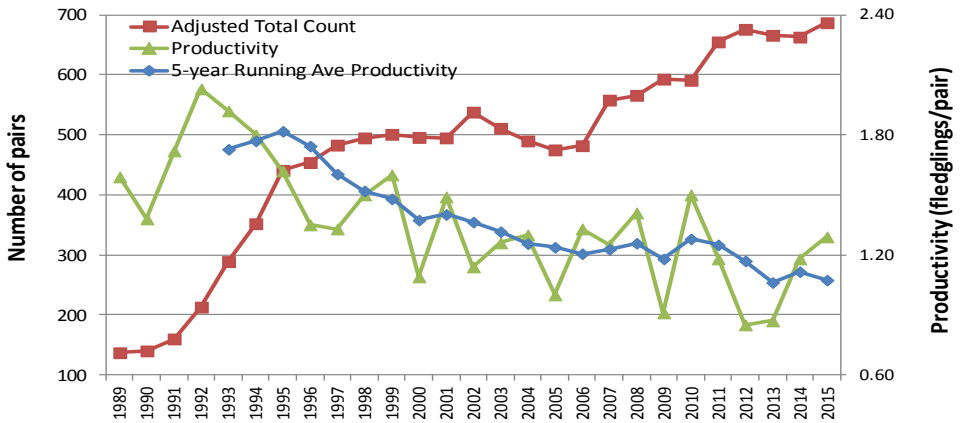
Figure 3. Percentages of nests lost to various predator types for nests suspected and likely to have been lost to predators in Massachusetts, 2015 (n=300).



Long term trends in breeding population size and productivity are shown in **Figure 4**. The five year running average of productivity is also shown in the figure, and may be useful to compare against the

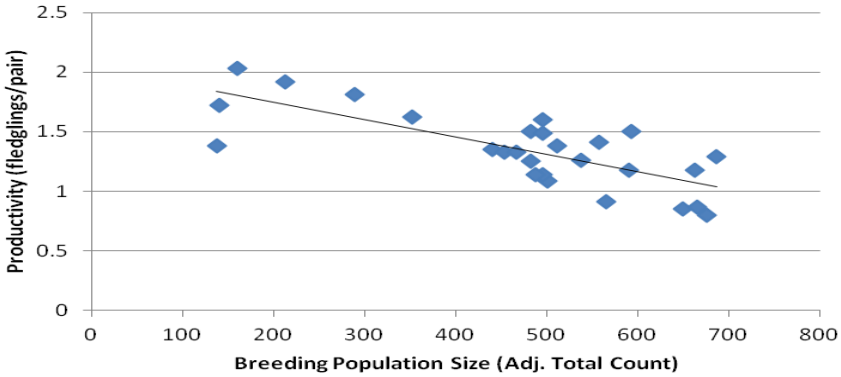
approximately 1.2 fledglings per pair thought to be necessary to maintain a stable population (Melvin & Gibbs 1996).[2]

Figure 4. Piping Plover abundance (Adjusted Total Count) and productivity (fledglings/pair) in Massachusetts, by year, 1989–2015.



The plot of population size over time shows a distinct slowing of the growth rate in 1995. During the period 1989-1995, the average annualized growth rate was 21.5% as compared to 2.2% for the period 1995-2015. The data are suggestive of another change-point around 2006-2007, with average annualized growth during the period 1995-2006 of 0.8%, followed by an annualized growth rate of 5.8% from 2006-2012. It would be interesting to know if this change in growth rate around 2006-2007 is associated with an increase in habitat availability perhaps related to coastal storm activity (J. Fraser, pers. comm.). The patterns observed are consistent with the possibility of an increasing influence of density dependent factors on population size and growth, particularly after 1995. A decline in productivity with increasing population size is also consistent with this idea (**Figure 5**), which may have significant management implications.

Figure 5. Piping Plover abundance (Adjusted Total Count) and productivity (fledglings/pair) in Massachusetts, 1989 – 2015.



[2] Melvin and Gibbs (1996) suggest that the actual fecundity needed to maintain a stable population may be slightly lower than the estimate derived from their model. Other researchers have also suggested that early estimates of fecundity needed for a stable population may have been high (e.g. Catlin et al. 2015).

ACKNOWLEDGEMENTS

This report was prepared by Jon Regosin, Jennifer Longsdorf, Amanda Veinotte, and Carolyn Mostello. We extend our sincere thanks to the many biologists, seasonal shorebird monitors, beach managers, landowners, and volunteers who participated in conservation efforts on behalf of Piping Plovers and other coastal waterbirds in Massachusetts in 2015. We also thank the more than 30 state and federal agencies, local municipalities and county government, local and regional land trusts, private conservation organizations, and universities that supported their efforts. We especially thank all the individuals who participated in population monitoring and submitted the data that are summarized in this report.

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U.S. Fish and Wildlife Service. 1996. *Piping Plover (Charadrius melodus) Atlantic Coast population revised recovery plan*. U.S. Fish and Wildlife Service, Hadley, MA. 245 pp.

Table 1. Abundance, distribution, and productivity of Piping Plovers in Massachusetts, 2015.

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
NORTH SHORE						
West Beach, Beverly	1	1	0	1	ECGA	
L Street Beach, Boston	0	ND	ND	0	MAS	
Lovell's Beach, Boston	0	0	0	0	MAS	
Constitution beach, East Boston	0	ND	ND	0	MAS	
Coffin's Beach/Wingaersheek Beach, Gloucester	4	4	7	4	DFW	
Two Penny Loaf, Gloucester	1	1	3	1	ECGA	
Crane Beach, Ipswich	36	37	46	37	TTOR	
Sandy Point State Reservation Beach, Ipswich	10	10	21	10	MAS	
Nahant, Nahant	1	1	1	1	MAS	
Parker River NWR, Newbury/Rowley	34	37	45	37	USFWS	
Newburyport Town Beach, Newburyport	3	3	7	3	MAS	
Point of Pines (Private), Revere	3	3	0	1	MAS	One pair at this site likely produced fledglings but the site was not visited frequently enough to be sure. Zero fledglings is based on the one nesting pair with a nest that failed late in the season.
Revere Beach, Revere	16.5	16.5	10	16.5	MAS	Two pairs and one unpaired male included in the index and total counts were present and territorial for more than two weeks, but no nesting attempts were ever detected.
Salisbury Beach State Reservation, Salisbury	0	0	0	0	MAS	
Carson Beach, South Boston	0	ND	ND	0	MAS	
Yirrell Beach, Winthrop	2	2	5	2	Winthrop	
Winthrop Beach, Winthrop	6	6	15	6	MAS	
SOUTH SHORE						
Sagamore Beach - Bourne, Bourne	2	2	6	2	MAS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Duxbury Beach, Duxbury, Plymouth	25	25	30	25	MAS	
Nantasket Beach, Hull	3	4	7	4	MAS	An unpaired adult was present >2 weeks but did not display territorial behavior and was not included in the Total Count.
Rexhame Beach, Marshfield	0	0	0	0	MAS	
Green Harbor, Marshfield	0	ND	ND	0	MAS	
Ellisville Harbor State Park, Plymouth	0	1	0	0	MAS	This pair later nested successfully at Ellisville Harbor; it is only counted in the Total Count for the state park.
Plymouth Long Beach, Plymouth	17	17	32	17	Plymouth	
Saquish, Plymouth	ND	ND	ND	0	MAS	
Ellisville Shifting Lots Preserve, Plymouth	1	0	3	1	MAS	The one nesting pair here first nested at Ellisville State Park and is counted in the total count for that site only.
Scusset Beach State Reservation, Sandwich	0	1	0	1	MAS	One pair observed for >2 weeks. No nests detected.
Sagamore Beach - Sandwich, Sandwich	3	3	6	3	MAS	
Fourth Cliff, Scituate	1	2	0	2	MAS	
Humarock, Scituate	1	1	0	1	MAS	
The Glades, Scituate	0	ND	ND	0	MAS	
Third Cliff, Scituate	3.5	5	8	5	MAS	Four pairs were confirmed to have nested. An unpaired, scraping male present before and during the index count later paired with a female, but no nesting was detected. A fourth breeding pair arrived on site after the index window.
UPPER CAPE						
Bone Hill Road, Barnstable	0	ND	ND	0	MAS	
Craigville Beach, Barnstable	1	1	4	1	MAS	
Dead Neck Sampsons Island, Barnstable	8	8	6	8	MAS	
Dowses Beach, Barnstable	0	1	0	1	Barnstable	One territorial pair was present 4/2-5/2 but apparently never nested.
Fortes Beach, Barnstable	0	ND	ND	0	MAS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Kalmus Beach, Barnstable	2	4	0	4	Barnstable	
Long Beach, Barnstable	3	4	2	4	MAS	
Loop Beach, Barnstable	ND	ND	ND	0	MAS	
Memorial Beach/Covell's, Barnstable	0	ND	ND	0	MAS	
Mussel Point, Barnstable	0	ND	ND	0	MAS	
Rushy Marsh Pond Beach, Barnstable	0	ND	ND	0	MAS	
Sandy Neck Beach Park, Barnstable	37	40	55	40	Barnstable	
Sea St./ Keyes Beach, Barnstable	0	ND	ND	0	MAS	
Squaw Is. Road / Causeway, Barnstable	0	0	0	0	MAS	
Squaw Island, Barnstable	4	4	13	4	MAS	
Bassetts Island, Bourne	ND	ND	ND	0	MAS	
Mashnee Dike, Bourne	0	0	0	0	USACOE	
Mashnee Dike, Bourne	0	ND	ND	0	MAS	
Breakwater Beach, Brewster	0	ND	ND	0	MAS	
Crosby Landing Beach, Brewster	1.5	1.5	0	1.5	MAS	Unpaired male present during census and for more than two weeks.
Ellis Landing, Brewster	ND	ND	ND	0	MAS	
Linnell Landing Beach, Brewster	0	ND	ND	0	MAS	
Mants Landing, Brewster	0	ND	ND	0	MAS	
Paine's Creek, Brewster	0	ND	ND	0	MAS	
Point of Rocks Landing, Brewster	0	ND	ND	0	MAS	
Robin's Hill Beach, Brewster	0	ND	ND	0	MAS	
Saint's Landing, Brewster	ND	ND	ND	0	MAS	
Wings Island, Brewster	0	ND	ND	0	MAS	
Bayview, Dennis	0	0	0	0	Dennis	
Bayview Ave (Private), Dennis	0	1	0	1	MAS	
Cold Storage Beach, Dennis	0	0	0	0	Dennis	
Corporation Beach, Dennis	0	0	0	0	Dennis	
Depot Street, Dennis	ND	ND	0	0	Dennis	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Dr. Botero, Dennis	1	1	0	1	MAS	
Glendon Beach, Dennis	ND	ND	0	0	Dennis	
Haigis to Inman Rd., Dennis	ND	0	0	0	Dennis	
Harbor View, Dennis	0	0	0	0	Dennis	
Howe's St. Beach, Dennis	0	0	0	0	Dennis	
Inman Beach, Dennis	ND	ND	0	0	Dennis	
Mayflower Beach, Dennis	0	0	0	0	Dennis	
Metcalf Memorial, Dennis	ND	ND	0	0	Dennis	
Miramar Beach (Swan River), Dennis	1	1	3	1	MAS	
Raycroft Beach, Dennis	ND	ND	0	0	Dennis	
Sea Street (West Dennis), Dennis	ND	ND	0	0	Dennis	
Sea Street Beach, Dennis	0	0	0	0	Dennis	
Sesuit Harbor Beach, Dennis	ND	ND	ND	0	MAS	
Acapesket Beach, Falmouth	0	ND	ND	0	MAS	
Black Beach, Falmouth	2	2	5	2	MAS	
Chappaquoit Beach, Falmouth	0	ND	ND	0	MAS	
Falmouth Heights, Falmouth	ND	ND	ND	0	MAS	
Little Island Beach, Falmouth	0	ND	ND	0	MAS	
Menauhant Beach, Falmouth	0	0	0	0	MAS	
Old Silver Beach, Falmouth	0	ND	ND	0	MAS	
Sippewisset, Falmouth	0	0	0	0	MAS	A pair was present and scraping at this site for more than 2 weeks but was not observed to nest. This pair is believed to have moved to the adjacent Woodneck Beach where it nested. It is only counted in the total count for Woodneck.
Washburn Island, Falmouth	3.5	3.5	4	3.5	MAS	A single territorial bird was present during the census window and for more than two weeks.
Woodneck Beach, Falmouth	1	1	1	1	MAS	This pair was observed scraping for more than two weeks at adjacent Sippewisset. It is only counted in the total pair count at Woodneck Beach.
Trunk River, Falmouth	1	1	2	1	MAS	
Allens Harbor, Harwich	0	0	0	0	MAS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Bank St, Harwich	0	0	0	0	MAS	
Belmont Condos, Harwich	0	ND	ND	0	MAS	
Earle Rd. Beach, Harwich	0	0	0	0	MAS	
Grey Neck Road Beach, Harwich	0	0	0	0	MAS	
Red River Beach, Harwich	0.5	0.5	0	0.5	MAS	One unpaired scraping adult present; no nesting.
Saquatucket Beach, Harwich	0	0	0	0	MAS	
Inn on the Beach, Harwich	1	1	0	1	MAS	
Merkel, Harwich	1.5	1.5	0	1.5	MAS	One pair and one unpaired adult were present and territorial for much of the season, but no nests were detected.
Winstead Inn, Harwich	0	0	0	0	MAS	
Wychmere , Harwich	2	2	0	2	MAS	
New Seabury, Mashpee	1	1	3	1	MAS	
Popponesset Spit, Mashpee	3	3	9	3	MAS	
Rock Landing/Maushop Village, Mashpee	ND	ND	ND	0	MAS	
South Cape Beach, Mashpee	5.5	5.5	1	5.5	MAS	An unpaired territorial male was present for more than two weeks including during the census window.
East Sandwich, Sandwich	2	2	2	2	MAS	
Scorton Neck (Torrey), Sandwich	3	3	3	3	MAS	
Scorton Shores, Sandwich	1	1	3	1	MAS	One pair nested on Sandy Neck after courting on Scorton Shores for three weeks. This pair is counted only at Sandy Neck.
Spring Hill, Sandwich	5	7	5	7	MAS	
Town Neck Beach, Sandwich	2.5	3	1	3	MAS	
Bass River Beach / Smuggler's, Yarmouth	0	ND	ND	0	MAS	
Colonial Acres-Standish Way, Yarmouth	ND	ND	ND	0	MAS	
Grays Beach, Yarmouth	1	1	2	1	MAS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Great Island Causeway, Yarmouth	3	2.5	3	2.5	MAS	One pair that nested here is believed to have renested at Radio City Beach. It is counted as 0.5 pairs in the total counts for both sites.
Great Island - Smith Point, Yarmouth	2	2	0	2	MAS	
Radio City Beach, Yarmouth	0	0.5	0	0.5	MAS	The nesting attempt here is believed to be renest attempt for a pair first observed nesting at Great Island Causeway. It is counted as 0.5 pairs in the total counts for both sites.
Red Jacket Inn, Yarmouth	0	ND	ND	0	MAS	
Seagull Beach, Yarmouth	4	5	11	5	MAS	
Standish Way, Yarmouth	0	ND	ND	0	MAS	
LOWER CAPE						
Andrew Harding Way, Chatham	0	ND	ND	0	MAS	
Chatham Bars Inn, Chatham	0	ND	ND	0	MAS	
Chatharbor Lane (Mill Ck.), Chatham	0	0	0	0	MAS	
Claflin Landing, Chatham	0	ND	ND	0	MAS	
Cockle Cove, Chatham	0	0	0	0	MAS	
Forest Beach, Chatham	2	2	6	2	MAS	
Harding Beach, Chatham	3	3	5	3	MAS	
Harding Shores, Chatham	0	0.5	0	0.5	MAS	This pair renested at Harding's Shores after nesting at Ridgevale and is counted as 0.5 pairs in the total counts for both sites.
Linnell Lane, Chatham	0	ND	ND	0	MAS	
Minimoy Island, Chatham	1	1	0	1	USFWS	
Morris Island Dike/ Hardings Beach Point, Chatham	2	2	5	2	MAS	
Morris Island Dredge Spoil, Chatham	0	0	0	0	MAS	
North (Nauset) Beach, Chatham	13	13	27	13	Chatham	
North Beach Island, Chatham	21	23	16	16	Chatham	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
North Monomoy Island, Chatham	1	1	0	1	USFWS	
Pleasant St. Beach, Chatham	0	0	0	0	MAS	
Ridgevale Beach, Chatham	1	0.5	0	0.5	MAS	This pair renested at Harding Shores and is counted as 0.5 pairs in the total count for both sites.
South Beach (North of Break) , Chatham	8	8	0	8	MAS	One transient pair observed on-site on 6/4 was believed to be from an adjacent site and was not included in the index count.
South Beach (South of Break) , Chatham	28	30	24	30	MAS	
South Monomoy Island, Chatham	41	43	58	41	USFWS	
Tern Island, Chatham	2	2	0	2	MAS	
Chapin Beach, Dennis	4	4	4	4	Dennis	
Crowes Pasture (Cole's Pond) / Quivett Neck, Dennis	1	1	0	1	Dennis	
South Village Beach, Dennis	0	0	0	0	Dennis	
West Dennis Beach, Dennis	5	4	1	4	Dennis	A territorial pair was observed during the census period but was present for <2 weeks.
Boat Meadow, Eastham	0	ND	ND	0	MAS	
Campground Beach, Eastham	ND	ND	ND	0	MAS	
Coast Guard Beach, Eastham	9	9	9	9	NPS	
Cooks Beach, Eastham	ND	ND	ND	0	MAS	
First Encounter Beach, Eastham	0	0	0	0	MAS	
Nauset Light Beach, Eastham	0	0	0	0	NPS	
Rock Harbor (north and south sides), Eastham	ND	ND	ND	0	MAS	
South Sunken Meadow, Eastham	2	2	3	2	MAS	
North Spit, Orleans	6	6	7	6	Orleans	
Rock Harbor, Orleans	0	ND	ND	0	MAS	
Skaket Beach, Orleans	0	ND	ND	0	MAS	
South Beach (Nauset), Orleans	12	12	35	12	Orleans	
New Island, Orleans, Eastham	0	0	0	0	NPS	
Herring Cove Beach, Provincetown	0	0	0	0	NPS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Long Point/Wood End, Provincetown	4	4	7	4	NPS	
Race Point North/Hatches Harbor, Provincetown	6.5	6	4	6	NPS	
Race Point-South Beach, Provincetown, Truro	10	9	18	9	NPS	Two pairs that renested at Race Point South (RPS) are believed to have first nested at High Head (HH)and are included in the total count HH but not RPS. One RPS renesting pair that first nested at Coast Guard Beach Truro (CBT) is included in the CBT total count but not RPS.
Ballston Beach, Truro	2	3	0	3	NPS	
Beach Point, Truro	1	1	1	1	MAS	
Between Corn Hill Beach and Beach Point, Truro	0	nd	nd	0	MAS	
Coast Guard Beach, Truro	0	0	0	0	MAS	
Coast Guard Beach, Truro	5	5	7	5	NPS	One pair that nested at this site was believed to have renested at High Head. This pair is only counted in the total count for Coast Guard Beach (CBT). A second pair from CBT is believed to have later renested at Race Point South is only counted in the total count for CBT.
Corn Hill Beach, Truro	2	2	0	2	MAS	
Fisher Beach, Truro	1	1	1	1	MAS	
Fisher Beach South, Truro	1	1	4	1	MAS	
Head of Meadow, Truro	0	0	0	0	MAS	
Head of the Meadow, Truro	6	6	0	6	NPS	
High Head, Truro	0	2	0	2	NPS	One nest at this site was believed to be a renest of a pair that first nested at Coast Guard Beach, Truro. This pair is only counted in the total count for Coast Guard Beach. The two remaining pairs nesting at High Head are believed to have later renested at Race Point South (RPS) and are not counted in the RPS total. Two fledglings produced from one of these renests are counted at RPS.
Longnook Beach, Truro	0	0	0	0	NPS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Ryder Beach, Truro	0	0	0	0	MAS	
Ballston Beach, Truro	1	1	0	1	MAS	
Bound Brook, Wellfleet	1	1	0	1	NPS	
Cahoon Hollow, Wellfleet	1	1	0	1	NPS	
Duck Harbor, Wellfleet	2	2	0	2	NPS	
Field Point /Fox Is. WMA, Wellfleet	0	0	0	0	MAS	
Great Is., Wellfleet	4	4	1	4	NPS	
Indian Neck, Wellfleet	0	ND	ND	0	MAS	
Jeremy Point, Wellfleet	4	5	3	5	NPS	
Lecount Hollow, Wellfleet	0	0	0	0	NPS	
Lieutenant Island - NW, Wellfleet	0	0	0	0	MAS	
Lieutenant Island - SW, Wellfleet	0	0	0	0	MAS	
Lieutenant Island - The Hook, Wellfleet	0	ND	0	0	MAS	
Marconi Beach, Wellfleet	8	8	10	8	NPS	
Marconi Station, Wellfleet	3	3	0	3	NPS	
Mouth of Herring River - Mayo Beach, Wellfleet	0	ND	ND	0	MAS	
White Crest Beach, Wellfleet	0	0	0	0	NPS	
Newcomb Hollow, Wellfleet, Truro	2	3	5	3	NPS	
BUZZARDS BAY - NORTHWEST						
Barney's Joy/Little Beach, Dartmouth	16	18	28	18	MAS	
Demarest Lloyd State Park, Dartmouth	7	7	9	7	LCES	
Nonquitt, Dartmouth	1	1	4	1	MAS	
Round Hill Beach, Dartmouth	1	1	3	1	MAS	
Salters Pond, Dartmouth	1	1	2	1	MAS	
Timmy's Rock, Dartmouth	0	0	0	0	MAS	
Long Island, Fairhaven	1	1	3	1	DFW	
Round Is., Fairhaven	1	ND	ND	0	DFW	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
South Shore Marshes, Fairhaven	1	1	ND	0	DFW	
Ward's Rock, Fairhaven	0	0	0	0	MAS	
West Island, Fairhaven	4	5	3	5	LCES	
Winsegansett Heights, Fairhaven	1	1	3	1	LCES	A second pair or lone adult was observed on three occasions over a 3 week period from 6/27-7/17. This pair/individual was not included in the total count.
Haskell Island, Marion	0	ND	ND	0	MAS	
Meadow Island, Marion	0	ND	ND	0	MAS	
Planting Island, Marion	0	ND	ND	0	MAS	
Ram Is., Marion	ND	ND	ND	0	MAS	
Stewart's Island, Marion	0	ND	ND	0	MAS	
Brandt Island, Mattapoisett	1	1	4	1	DFW	
Pine Island (Angelica Point and Strawberry Point), Mattapoisett	3	3	4	3	DFW	
Ram Is., Mattapoisett	0	0	0	0	DFW	
Cedar Island, Wareham	0	ND	ND	0	MAS	
Little Harbor Beach, Wareham	1	2	4	2	MAS	
Long Beach Point, Wareham	2	2	4	2	MAS	
Stony Point Dike, Wareham	1	1	0	1	USACOE	
Swift's Beach, Wareham	0	ND	ND	0	MAS	
Acoaxet, Westport	1	1	0	1	TNCRI	
Bakers Beach / Westport Town Beach, Westport	2	3	3	3	MAS	
Cockeast Pond (Elephant Rock), Westport	3	3	3	3	TNCRI	
East Beach, Westport	0	0	0	0	MAS	
Fishing Rock, Westport	0	ND	ND	0	MAS	
Gooseberry Neck, Westport	0	0	0	0	LCES	
Horseneck Beach State Reservation, Westport	11	12	23	12	LCES	
Richmond Pond, Westport	2	2	2	2	TNCRI	
Speaking Rock, Westport	0	ND	ND	0	MAS	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
ELIZABETH ISLANDS						
Cuttyhunk Island, Gosnold	ND	ND	ND	0	DFW	
Nashawena Island-Canapitsit, Gosnold	ND	ND	ND	0	DFW	
Nashawena Island-Quicks Hole, Gosnold	ND	ND	ND	0	DFW	
Naushon Is. - Crescent Beach, Gosnold	ND	1	ND	0	DFW	One nest confirmed, outcome unknown. This may be an undercount as monitoring was limited.
Naushon Is. - Kettle Cove, Gosnold	ND	ND	ND	0	DFW	
Naushon Is. – Robinson's Hole, Gosnold	ND	ND	ND	0	DFW	
Naushon Is. – Tarpaulin Cove, Gosnold	1	1	ND	0	USGS	At least one pair nested and hatched three chicks. This may be an undercount due to limited monitoring.
Naushon Is. - West Beach, Gosnold	ND	ND	ND	0	DFW	
Pasque Island-Cobbly, Gosnold	ND	ND	ND	0	DFW	
Pasque Island-Quicks Hole, Gosnold	ND	ND	ND	0	DFW	
Pasque Island-Robinson's Hole, Gosnold	ND	ND	ND	0	DFW	
Penikese Island, Gosnold	0	0	0	0	DFW	
MARTHA'S VINEYARD						
Dogfish Bar, Aquinnah	8	8	3	8	BW	
Lobsterville Beach, Aquinnah	0	0	0	0	MAS	
Moshup Beach, Aquinnah	1	1	1	1	MVLBC	
Philbin Beach, Aquinnah	0	ND	ND	0	BW	
Black Point Pond, Chilmark	0	0	0	0	BW	
Cape Higgon, Chilmark	2	2	1	2	BW	
Chilmark Pond, Chilmark	2	2	7	2	BW	
Chilmark Pond Preserve, Chilmark	0	0	0	0	MVLBC	
Edys Island, Chilmark	0	ND	ND	0	MAS	
Great Rock Bight Preserve, Chilmark	0	0	0	0	MVLBC	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Lucy Vincent Beach, Chilmark	1	1	3	1	BW	
Nomans Land Island NWR, Chilmark	ND	ND	ND	0	USFWS	
Quansoo, Chilmark	2	4	0	4	MAS	
Spring Point, Chilmark	0	0	0	0	BW	
Squibnocket Beach/Long Beach, Chilmark	3	4	5	4	BW	
Stonewall Beach, Chilmark	0	0	0	0	BW	
Arruda's Point / The Jetties, Edgartown	0	0	0	0	TTOR	
Bend-in-the-Road Beach, Edgartown	0	0	0	0	MAS	
Big Gravel Is., Edgartown	0	0	0	0	MAS	
Caleb's Pond, Edgartown	ND	0	0	0	BW	
Cape Pogue Elbow / The Narrows, Edgartown	3	5	0	5	TTOR	
Chappaquiddick Point Beach, Edgartown	0	0	0	0	MVLBC	
Cow Bay, Edgartown	2	2	0	2	MAS	
Cracktuxet Trust Beach, Edgartown	0	0	0	0	BW	
Edgartown Great Pond, Edgartown	0	0	0	0	MVLBC	
Edgartown Great Pond (Job's Neck), Edgartown	7	8	9	8	BW	
Haystack Island, Edgartown	0	0	0	0	MAS	
Leland / East Beach, Edgartown	8	8	6	8	TTOR	
Lighthouse Beach, Edgartown	1	1	0	1	BW	
Little Beach / Eel Pd., Edgartown	2	3	5	3	BW	
Little Gravel Is., Edgartown	0	0	0	0	MAS	
Little Neck, Edgartown	0	0	0	0	TTOR	
Norton Point Beach, Edgartown	4.5	4	12	4	TTOR	
Oyster Pond, Edgartown	0	0	0	0	BW	An unpaired male was observed from June 4 to June 13 and never displayed territorial behavior.
Paqua Pond, Edgartown	ND	ND	ND	0	BW	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Pease's Pond, Edgartown	0	0	0	0	BW	
South Beach, Edgartown	0	0	0	0	BW	
Sylvia State Beach, Edgartown	1	1	0	1	MAS	
Wasque, Edgartown	0	0	0	0	TTOR	
Yorke - Allen Point, Edgartown	0	0	0	0	MAS	
Dougs Cove Preserve, Oak Bluffs	0	0	0	0	MVLBC	
Eastville Beach, Oak Bluffs	0	0	0	0	MAS	
Harthaven, Oak Bluffs	1	1	0	1	MAS	
Sarson Is., Oak Bluffs	0	0	0	0	MAS	
Sylvia State Beach, Oak Bluffs	0	1	0	1	MAS	
Beach Road Causeway, Tisbury	0	ND	ND	0	MAS	
East Tashmoo, Tisbury	0	0	0	0	MAS	
Lagoon Pond-Maciel Marine/Ferry Boat Island, Tisbury	0	ND	ND	0	MAS	
Mink Meadows /West Chop, Tisbury	3	3	1	3	MAS	
West Tashmoo, Tisbury	4	4	5	4	BW	
Wilfrids Pond Preserve, Tisbury	0	0	0	0	MVLBC	
Grove Avenue , Tisbury	0	0	0	0	MAS	
Cedar Tree Neck, West Tisbury	2	2	0	2	BW	
Lamberts Cove, West Tisbury	0	0	0	0	BW	
Long Point, West Tisbury	0	0	0	0	TTOR	
Paul's Point, West Tisbury	1	1	2	1	BW	
Sepiessa Point Reservation, West Tisbury	0	0	0	0	MVLBC	
Seven Gates, West Tisbury	1	1	0	1	BW	
Tisbury Great Pond, West Tisbury	2	2	5	2	MVLBC	
Watcha Pond, West Tisbury	1	2	5	2	BW	
NANTUCKET						
Capaum Pond, Nantucket	0	1	1	1	NCF	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Coatue, Nantucket	2	2	2	2	NCF	
Coskata-East Beach, Nantucket	0	1	0	1	TTOR	
Coskata-West Beach, Nantucket	1	1	0	1	TTOR	
Dionis Beach, Nantucket	0	0	0	0	Nantucket	
Eel Point, Nantucket	9	10	15	10	NCF	
Great Point, Nantucket	2	2	2	2	TTOR	
Hoicks Hallow, Nantucket	0	ND	ND	0	MAS	
Hummock and West Hummock Ponds, Nantucket	1	1	1	1	NCF	
Jetties Beach, Nantucket	1	2	5	2	Nantucket	
Little Neck, Nantucket	0	0	0	0	NCF	
Long Pond, Nantucket	1	1	0	1	NCF	
Low Beach, Nantucket	1	1	0	1	Nantucket	
Madaket Beach, Nantucket	ND	ND	ND	0	Nantucket	
Minimusk Is., Nantucket	ND	ND	ND	0	MAS	
Monomoy Creeks, Nantucket	0	0	0	0	NCF	
Muskeget Is., Nantucket	1	ND	ND	0	MAS	
Polpis Harbor (Medouie Creek and Pocomo Meadows), Nantucket	0	0	0	0	NCF	
Quaise Point, Nantucket	ND	ND	ND	0	Nantucket	
Quidnet/Sesachacha Pond/Greenhills, Nantucket	3	3	8	3	MAS	
Sheep Pond, Nantucket	0	0	0	0	NCF	
Smith Point / Esther Is., Nantucket	5	5	0	4	Nantucket	
Smith's Point, Nantucket	0	1	0	1	MAS	
South Pastures (Madequecham Valley to Tom Nevers), Nantucket	0	0	0	0	NCF	
Squam Pond, Nantucket	0	0	0	0	NCF	
Surfside/Western Ave, Nantucket	1	1	2	1	Nantucket	
The Galls, Nantucket	4	4	0	4	TTOR	
The Haulover, Nantucket	0	0	0	0	NCF	

Site	Index Count[a] (no. pairs)	Total Count[b] (no. pairs)	No. chicks fledged[c]	No. pairs with fledge data[c]	Source[d]	Notes
Tuckernuck Is. - Bigelow's Point, Nantucket	ND	ND	ND	0	TLT	
Tuckernuck Is. - East Pond, Nantucket	ND	ND	ND	0	TLT	
Tuckernuck Is. - North Pond, Nantucket	ND	ND	ND	0	TLT	
Tuckernuck Is. - Whale Point, Nantucket	ND	ND	ND	0	TLT	
UMass Field Station, Nantucket	0	0	0	0	NCF	
Wauwinet, Nantucket	0	ND	ND	0	MAS	
Western Ave, Nantucket	2	2	7	2	MAS	
UNADJUSTED TOTALS	**663**	**710**	**866**	**695**		
ADJUSTED TOTALS		**687**		**672**		

[a] *Index Count* = number of pairs counted between 1-9 June 2015, the standardized *Index Count* period for the Atlantic Coast population.

[b] *Total Count* = total number of territorial or breeding pairs present at a site for at least 2 weeks during the breeding season.

[c] *Chicks fledged* are defined as chicks $\geq$ 25 days of age or observed in flight, whichever occurs first. Number of *Pairs with fledge data* includes all pairs for which number of *chicks fledged* was determined; this includes not only pairs that successfully fledged chicks, but also pairs for which no nests were found, pairs that nested unsuccessfully, and pairs whose chicks failed to fledge.

[d] Source = primary source(s) that provided monitoring data: Barnstable = Town of Barnstable, BW = BiodiversityWorks, Chatham = Town of Chatham, Dennis = Town of Dennis, DFW = Massachusetts Division of Fisheries & Wildlife, ECGA = Essex County Greenbelt Association, LCES = Lloyd Center for Environmental Studies, MAS = Massachusetts Audubon Society, MVLBC = Martha's Vineyard Land Bank Coalition, Nantucket = Town of Nantucket, NCF = Nantucket Conservation Foundation, NPS = National Park Service, Orleans = Town of Orleans, Plymouth = Town of Plymouth, TLT = Tuckernuck Land Trust, TNCRI = The Nature Conservancy - Rhode Island Chapter, TTOR = The Trustees of Reservations, USACOE = U.S. Army Corps of Engineers, USFWS = U.S. Fish & Wildlife Service, USGS = United States Geological Survey, Winthrop = Town of Winthrop

Erratum

An earlier version of this report incorrectly assigned four sites to the Upper Cape that should have been included in the Lower Cape. Washburn Island, Falmouth had 3.5 pairs with fledge data, not 3. Dowses Beach, Barnstable had one pair with fledge data. Adjusted and Total Pairs with Fledge Data are 672 and 695, respectively (not 671 and 694).